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ABSTRACT

In view of the recent deregulatory developments in the United States' telecommunications industry, it is useful to reassess the issue of consumer videotex, especially as it relates to the implementation of electronic directory services. The success of the French videotex network Minitel relies on 10 principles: (1) cost of terminals; (2) no-frills terminals; (3) understanding the needs and wants of videotex users; (4) proper timing of introduction; (5) centralized authority to manage the videotex system; (6) organizing competition in a favorable regulatory environment; (7) long-range goals orientation; (8) consolidated billing policy; (9) single-standard system; and (10) individualized mass medium. To examine how major U.S. telecommunications companies perceive the establishment of an electronic directory service, a mail survey was sent to 12 executives in charge of planning and development in seven Regional Bell Operating Companies and five independent telephone companies. Ten returned completed questionnaires. Findings indicated that the Bell Companies are very likely to offer electronic white and yellow pages in the near future, while the independent companies seemed unlikely to do so; that telecommunications companies perceived it as unlikely that they will supply low-cost terminals for electronic white pages in the near future; and that the endorsement of a common standard is not likely. (Three tables of data are included and 101 references are attached.) (SR)

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Applying the French Minitel Model to U.S. Consumer Videotex:

The Case of the Electronic Directory Service

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ABSTRACT

In view of the recent deregulatory developments in the U.S. telecommunications industry, it is necessary to reassess the issue of consumer videotex, especially as it relates to the implementation of electronic directory services. Using the Minitel model as a point of reference, this paper examines how major U.S. telecommunications companies perceive the establishment of an electronic directory service in this country. The success of Minitel relies on 10 principles: (1) cost of terminals; (2) no-frills terminals; (3) understanding the needs and wants of videotex users; (4) proper timing of introduction; (5) centralized authority to manage the videotex system; (6) organizing competition in a favorable regulatory environment; (7) long-range goals orientation; (8) consolidated billing policy; (9) single-standard system; (10) individualized mass medium. A mail survey was conducted among the seven Regional Bell Operating Companies and five independent telephone companies. The results indicate that the Bell Companies are very likely to offer electronic white and yellow pages in the near future. On the other hand, telecommunications companies are not prompt to provide low-cost terminals or to endorse a common standard for videotex terminals. Implications of the study and recommendations for accelerating the introduction of electronic directory services are also discussed.

Applying the French Minitel Model to U.S. Consumer Videotex:

The Case of the Electronic Directory Service

I. INTRODUCTION

With a total of 4,396,000 terminals as of February 1989 ("Télétel en Chiffres," 1989), Minitel[1] exemplifies the successful entry of information technology in the home. In the last years, France Télécom, the French Telecommunications Authority, formerly the Direction Générale des Télécommunications, has vigorously promoted its videotex system domestically and internationally. In the United States, Minitel has appeared on the telecommunications market on several occasions. For example, in March 1987, U.S. Videotel, a Houston-based firm, inaugurated the first American videotex network using Minitel terminals 1 Bistandard ("U.S. Videotel," 1988). In March 1989, the company proposed more than 50 domestic information services and access to 1,500 French services.

Another example is the co-venture agreement concluded in May 1988 between U.S. West, one of the seven Regional Bell Operating Companies (RBOCs), and Minitel USA, a subsidiary of France Télécom. Both companies will cooperate to launch an experimental videotex service in Omaha, Nebraska, compatible with the Télétel system ("Videotex," 1988). The trial is scheduled to start in October 1989.

Although these two ventures mainly attest to France Télécom's competitiveness in the export of their technology and know-how, they also illustrate the possible revival of the videotex industry in the United States. Three years after the shutdown of Viewtron and Gateway operations, most RBOCs are preparing their entry into the videotex business, at least on a trial basis, as they are now permitted by District Court's Judge Harold Green to transmit information services.

For example, in September 1988, BellSouth was the first RBOC to introduce a public videotex gateway in Atlanta, the TranstexT Universal Gateway, linking PC owners to information providers (Wilson, 1988a). A gateway connects networks with different protocols. In March 1989, Southwestern Bell began conducting a mass-market data and voice gateway

trial in Houston for 12 months. More than one million users are able to gain access to information services provided by U.S. Videotel through Minitel terminals or software packages. In 1988, several Bell Companies petitioned the Federal Communications Commission (FCC) for waivers to initiate trials of gateways services (e.g., New England Telephone and Telegraph Co., 1988; Bell Atlantic Telephone Cos., 1988).

In view of this renewed videotex activity, new predictions are being made for videotex penetration in the next decade. As of February 1989, the Videotex Industry Association (VIA) estimates that more than 1 million individuals[2] subscribe to consumer videotex services, such as Prodigy, Dow Jones News/Retrieval, CompuServe, or the Source. VIA envisions that 97% of North American homes will have access to videotex services by the year 2000 (Videotex Industry Association, 1988).

On the other hand, Minitel USA, less optimistic, predicts that at least 12 million Americans and Canadians (i.e., at least a 12% penetration rate) will use videotex services by 1999 ("Videotex," 1988). In other words, this estimation suggests that the U.S. penetration rate of videotex will increase from about 1% to 12% in 11 years. These statistical data should be cautiously interpreted as the 1982-1983 predictions announcing the first coming of videotex turned out to be grossly overestimated. At this time, forecasts had ranged from a 10% to a 45% penetration rate by 1990 ("Teletext and Videotext," 1982; "Videotex' 83," 1983).

These few paragraphs have briefly shed some light on the past, current, and future situation of videotex in the United States. Specifically, the continuing success of Minitel in France and the recent deregulatory developments in the U.S. telecommunications industry stimulate a reexamination of the videotex question in this country.

The purpose of this comparative paper is threefold: (a) to examine the ten key reasons accounting for the success of Minitel and analyze these elements in the U.S. context; (b) to describe the functions of the electronic directory service (EDS) and sketch a possible scenario for the implementation of EDS in the United States; and (c) to empirically assess the reactions of the major U.S. telecommunications companies to an EDS format based on the Minitel model - computerized white and yellow pages. In France, the electronic directory service

(EDS) has promoted information technology in the home in a progressive and somewhat equitable fashion. For example, while a majority of the target audience still belongs to middle/upper class, 45% of Minitel users are females ("Enquête," 1988). EDS has contributed to demystify the terrifying complexity of computer terminals and to acquaint the general public with basic computer commands. Given the proprietary and futuristic nature of the topic, this section will be primarily exploratory and will serve to indicate possible directions or trends of the videotex industry in the next decade. Finally, I will conclude this paper by formulating recommendations for the future implementation of EDS in the United States.

II. SURVEY OF LITERATURE: TEN REASONS FOR THE MINITEL SUCCESS

To study the possible application of videotex to telephone directory, it is important to understand what type of variables have contributed to the success of the French experience. Also, it is worth noting that in the case of Minitel, all these conditions were present at the same time. Another motive for examining the Minitel model is to compare American and French videotex operations and to draw lessons from the Viewtron and Gateway failures.

1. Cost of terminals

From 1981 to February 1989, France Télécom distributed or rented out 4,396,000 Minitel terminals to French consumers ("Télétel en Chiffres," 1989). Ninety-one percent of those terminals (3,998,000) were issued at no cost to telephone subscribers to replace their printed phone directory, and 9% were rented out to consumers as well as businesses for a $12-20 monthly charge (Nahon & Pointeau, 1987). This year, France Télécom stopped supplying free terminals to consumers living in saturated areas, such as Paris. In this case, subscribers are required to pay a fee for the rental of the terminal. The Authority, however, will continue to distribute terminals free of charge in nonsaturated areas at least until the end of 1989. Currently, the basic Minitel terminal costs about $160 to produce (Markham, 1988). The free distribution of terminals, often qualified as governmental subsidization, contributed in great part to the success of Minitel and the rapid consumer acceptance of videotex in France

(Charon, 1987a; Baer & Greenberger, 1987; De Bens & Knoche, 1987; Maury, 1987; Vedel, 1988; Hart, 1988; Mayer, 1988).

In contrast, in the United States, Viewtron sold AT&T Sceptre videotex terminals to subscribers for $900, later discounted to $600 (Aumente, 1987). Academic and professional researchers stress that the growth of consumer videotex is conditioned by the cost of the terminal (Campbell & Thomas, 1981; De Bens & Knoche, 1987; Meier and Bonfadelli, 1987). Yet, Mayer (1988) notes the improbability that American telephone companies will distribute free terminals to all subscribers. Nevertheless, he suggests that the distribution of free terminals to specific target audiences could be part of an effective promotional strategy.

2. No-frills terminals

The basic Minitel terminal is what Peterson (1986) calls a "no-frill" terminal. The free Minitel 1 terminal is best described as a "dumb," dedicated terminal (i.e., with no or little memory and nonprogrammable). It was not designed to become a colorful, graphics-oriented device. On the contrary, Minitel was devised to be easy and simple to use for all consumers. In order to stimulate the mass consumption of videotex services, France Télécom decided to offer this type of unsophisticated terminal (Maury, 1987; Charon, 1987b). The Authority argues that personal computers are too complex and expensive to serve as videotex terminals (Booker, 1988). On the other hand, U.S. information providers, such as Prodigy and Quantum Computer Services, favor the PC alternative because it enables a greater processing capability and can cope more easily with the future developments of videotex (Background Information on the Prodigy Interactive Personal Service, 1989; "Videotex," 1988).

In addition, French researchers found that many heavy users are not really attracted by elaborate graphics (Hart, 1988). It is frequently argued that the impact of Minitel as a user-friendly terminal has been the main reason for the rapid growth of videotex in France (Branscomb, 1984; Baer & Greenberger, 1987; Maury, 1987; Hall & Terren, 1987).

In the United States, Noll (1985) quoted a former director of Prestel who contended that "graphics may be a snare and a delusion" (p. 100). In fact, Viewtron and Gateway users expressed an unwillingness to pay for flashy color graphics (Diebold, 1988). As Aumente

(1987) suggests, an overreliance on sophisticated graphics and color display may have partially deterred Viewtron and Gateway users.

Empirical research in this area tends to support this assumption (Atwater, Heeter, & Brown, 1985; Heeter, Atwater, Stanley, & Baldwin, 1987). Heeter et al. (1987) found that Viewtron users do not rate "elaborate graphics," "remote-control keypad," and "audio" as important elements of the videotex system. The authors also found that while color remains relatively unimportant to most users, it becomes more appreciated after a few videotex sessions. Users tend to place a strong emphasis on simple instructions rather than on sophisticated features (Atwater et al., 1985; Heeter et al., 1987).

3. Understanding the needs and wants of videotex users

The French information providers have understood that most consumers seek three main attributes in a videotex system: variety of services, communication, and fast retrieval of information. As of February 1989, Télétel offers 10,007 services to users, including the possibility of reserving a cab via terminal ("Télétel en Chiffres," 1989; "Videotex Around the World," 1988). This plethora of services allows users to opt for almost any service from news to messageries roses (i.e., adult-oriented chat lines) in an individualized and timely fashion (Mayer, 1988).

In fact, what consumers desire is really the right information at the right time (Campbell & Thomas, 1981; Diebold, 1988). Yet, the needs and wants of consumers may not be easy to pin down due to individual demands (e.g., Noll, 1985). Nevertheless, regardless of the type of service French videotex users most like or dislike, they enjoy a quasi-unlimited choice: chat services (16% of Télétel traffic in 1986/22% in 1987/19% in 1988), leisure and games (16%/14%/10%), general information, such as news and municipal information (8%/4%/5%), and banking services (6%/9%/11%) ("Télétel: Les Chiffres 1986," 1986; Maury, 1987; "Minitel: 1987 Facts and Figures," 1988; "Télétel: 1988 Facts and Figures," 1989). Besides the electronic directory service, chat and games services are the most frequently used, while general interest and information are less attractive to French users. In other words, interest in entertainment

currently prevails over information in the Télétel system (e.g., Charon, 1987a) although the need for financial services is expected to grow in the years to come (Markham, 1988).

In the United States, research shows that videotex users tend to prefer games, news, and sport to banking, shopping, and general interest services (Ledingham, 1984; Atwater et al. 1985; Heeter et al., 1987). Although cross-cultural artifacts may somewhat determine the type of videotex usage, it appears that consumers in both countries express a higher interest in entertainment-oriented services. In summary, videotex users should have at their disposal a variety of services that satisfy their personal needs.

Second, aside from the electronic directory service, Télétel 3 (i.e., the Kiosk for the general public) accounts for 50% of the Télétel traffic ("Télétel en Chiffres," 1989) and furthers the mass market for electronic news, features, games and chat services (Baer & Greenberger, 1987; Maury, 1987). Most popular in the Kiosk are the chat services which are largely responsible for promoting Minitel culturally as well as economically (Peterson, 1986; Epstein, 1986; Baer & Greenberger, 1987; Iwaasa, 1987; Mayer, 1988). As indicated above, electronic messaging service[3] accounts for 19% of the total number of connection hours in 1988 ("Télétel: 1988 Facts and Figures," 1989). Charon (1987a) explains how Télétel evolved from an interactive to a communicative pattern. In this article, "interaction" describes a mode of access to information and transactional services (e.g., banking services), while "communication" refers to exchanges that take place between individuals, within groups or institutions (e.g., chat services). The author points out that consumers have become not only members of a network, but also information providers (i.e., use of messaging services). In these terms, Minitel represents a new way to socialize and to promote interpersonal exchanges.

In the United States, Noll (1985) emphasized the role of interpersonal communication in videotex. In reviewing the literature, he found that customers of the Source have a special interest in electronic mail, bulletin boards, and chatting. Interestingly, Mayer (1988) notes that message services are popular in the United States, but not as much as in France. In summary, a videotex system should offer a diversity of services, including interpersonal features, such as messaging services.

Third, French videotex users expect to retrieve information about specific topics instantaneously (Peterson, 1986; Charon, 1987a). In surveying Minitel business users, France Télécom found that the three dominant requests for improving the system are: lower cost of use (19%), shorter waiting time for the words to appear (15%), and information about new services (15%) ("Enquête," 1988). In the United States, Viewtron users expressed a similar concern. Research demonstrated that users rate high the ability to retrieve information quickly and the convenience to wait as little as possible for the display of the text (Atwater et al., 1985; Heeter et al., 1987).

4. Proper timing of introduction

To partially explain the success of Minitel, France Télécom asserts that the installation of Minitel occurred at the time when the penetration rate of personal computers was low in France (Epstein, 1986; Nahon & Pointeau, 1987). Indeed, the lack of personal computers may have influenced the introduction of videotex terminals in the home, carving out a unique niche for the Minitel technology. By the end of 1985, the penetration rate of home computers had only reached 5% in France, as opposed to 11% in the Netherlands and 20% in the United Kingdom (Syndicat des Industries de Matériels Audiovisuels Electroniques, 1987). By comparison, the Electronic Industries Association estimated that 15% of U.S. households owned a personal computer in December 1985.

Yet, to causally link the development of videotex to the underdevelopment of home computers may be misleading and erroneous. For instance, the German videotex system Bildschirmtext encountered a mitigated enthusiasm even if the penetration of personal computers was only 5% by the end of 1985 (SIMAVELEC, 1987). In the United States, Reagan (1987) found a clear relationship between PC ownership and videotex use. In this study, almost 81% of videotex users were PC owners. In summary, the low penetration of home computers has probably affected the growth of Minitel to some degree. Nonetheless, there is little evidence that this situation may be replicable in other countries.

5. Centralized authority to manage the videotex system

Second to the free distribution of terminals, the most important factor accounting for the successful implementation of Minitel is the management of the system through a central authority, France Télécom. The literature recognizes the positive impact of France Télécom on the development of Minitel (Branscomb, 1984; Epstein, 1986; Baer & Greenberger, 1987; Charon, 1987a; Charon, 1987b; Modified Final Judgment, 1988; Vedel, 1988; Mayer, 1988; Branscomb, 1988). As a matter of national policy, France Télécom subsidizes the distribution of terminals, performs the billing mechanism, and manages the transmission of signals. It does not supervise or regulate the content, except the electronic directory service.

In Europe, the ministries of posts, telegraphs, and telephones (PTT) have regulatory and economic power to develop and finance national videotex networks (e.g., Tyler, 1979; Criner, 1981; Tydeman, Lipinski, Adler, Nyhan, & Zwimpfer, 1982). For example, it is estimated that France Télécom invested $2.3 billion in the Télétel system in the last years (Modified Final Judgment, 1988). In the United States, there is no such central body. Such a governmental or monopolistic venture would be incompatible with the spirit of the free enterprise system and would raise serious questions about possible violations of the Sherman and Clayton antitrust Acts.

6. Organizing competition in a favorable regulatory environment

A unique feature of Télétel is the synergy between public and private resources (Branscomb, 1984). France Télécom has implemented policies to stimulate competition among information providers (Charon, 1987a). As mentioned before, the French Authority confines its role to transmit the content of information, but does not offer any service itself, other than the directory. By not competing with information providers, France Télécom has encouraged private and public enterprises to develop their information services (Baer & Greenberger, 1987). Because the French Authority does not exert any control over the content of services (Branscomb, 1984), information providers are less likely to be inhibited by government regulation in their ventures. In sum, acting as a common carrier, France Télécom is bound to regulate the conduit, but not the content of videotex services.

In view of the U.S. entrepreneurial economic structure, it is not surprising to observe strict regulatory barriers preventing the largest telecommunications companies from monopolizing information services. The individual ability to develop a business in a fair competitive environment is one of the underpinnings of the American society. Yet, in adhering to this principle, the U.S. regulators have delayed the diffusion of videotex. Under the 1982 Modified Final Judgement, AT&T is prohibited from entering the information business for a period of seven years[6] (United States v. American Tel. and Tel. Co., 1982). The rationale for Judge Green's decision was to avoid a situation in which AT&T might behave anticompetitively.

In addition, the Court decided that because electronic publishing was still in its infancy, the RBOCs should be barred from providing information services for an indefinite time. These stipulations will remain in effect unless it is demonstrated "that there is no substantial possibility that an Operating Company could use its monopoly power to impede competition in the relevant market" (United States v. American Tel. and Tel. Co., 1982, p. 225).

This prohibition is to ensure that the RBOCs will not engage in anticompetitive activities by taking advantage of their monopolistic status in the telephone business and restraining the expansion of smaller companies. Interestingly, although AT&T is forbidden from offering information services, it is not precluded from providing electronic directory services that list products, business categories, and service or product providers with their name, phone number, and address (United States v. American Tel. and Tel. Co., 1982).

On September 10, 1987, the situation somewhat evolved in favor of the Bell Companies. In reviewing the results of the first triennial period, the Court authorized the RBOCs to transmit information services, but not generate them (United States v. Western Electric Co., 1987). Furthermore, Judge Green still prohibited them from offering computerized yellow pages.

On March 7, 1988, Judge Green clarified his September 1987 decision, but did not modify the main proviso of his previous order: the RBOCs may not generate or manipulate the content of information services (United States v. Western Electric Co., 1988). Nevertheless, in

relaxing the restriction on transmission of information services, the Court has encouraged the Bell Companies to initiate gateway trials.

Interestingly, the 1987 and 1988 decisions refer extensively to the Télétel system as a potential, albeit not exclusive, model to shape the future of consumer videotex services in the United States. One notes that the current legal status of the RBOCs, as far as information services are concerned, is nearly identical to the role of the Telecommunications Authority in France. But France Télécom's decision to adopt a content-neutral position was voluntary rather than mandatory. Moreover, given the dominant role of the RBOCs in the telephone industry, it is believed that electronic publishing, such as videotex, will not really develop on a mass-market scale until the Bell Companies are actively involved in this enterprise (Baer & Greenberger, 1987).

7. Long-range goals orientation

Given its governmental status, France Télécom was empowered to make long-range plans and investments for the establishment of Télétel. Such a subsidization approach definitely contributed to the growth of Minitel (Baer & Greenberger, 1987; Charon, 1987a; Nahon & Pointeau, 1987; Grenier & Nahon, 1987; Mayer, 1988). Originally, France Télécom estimated that it would take five years of revenues to amortize the free distribution of terminals. Because revenues have actually exceeded all expectations, the amortization period was reduced to four years (Hart, 1988). In November 1988, France Télécom expected to break even on the Télétel venture in 1989 and to defray its investment by 1993 (Markham, 1988).

France Télécom's long-range approach was economically fruitful. For example, in 1983, telephone traffic increased by 20% in areas where Minitel was available (Harris, Dreyfack & Berger, 1985). Another instance of Minitel's economic impact is the tripling of the 1986 revenue derived from the Kiosk, compared to those of 1985 (Grenier & Nahon, 1987). In light of the current situation, Minitel was able to provide a higher rate of return on investment than anticipated. In addition, this long-term strategy allows France Télécom to be flexible and to reposition its objectives to the changing marketplace. Illustrations of these adjustments comprise the shift from interaction to communication, the expanded role of information

providers in the videotex system, and the search for alliances with banks and newspapers (Nahon & Pointeau, 1987; Charon, 1987a).

In considering this option in the United States, Mayer (1988) argues that government subsidization with long-range investments is unlikely to occur, especially in the current let-the-marketplace-decide deregulatory environment. In fact, the issue at stake might be more economic and less regulatory. Long-range funding, especially for small telephone companies, might be incompatible with the current marketplace-based philosophy unless there are strong incentives, such as electronic yellow pages, for establishing a national videotex system. With an 85% penetration rate in the U.S. homes ("Teletext and Videotext," 1982), the RBOCs appear to be the most credible players as they possess sufficient capital to afford such heavy investments.

8. Consolidated billing policy

Minitel users pay a fee for information services based on the type of service and the amount of use. Therefore, they only pay for the time they actually use. Since summer 1987, information providers of the Kiosk can offer three different tariffs to Minitel users (0.84FF/minute, 0.98FF/minute, 1.25FF/minute, as of July 1, 1988) (Maury, 1987). As noted previously, France Télécom administers the billing system on behalf of the information providers. France Télécom retains approximately 30% of the total revenue to cover expenses from the billing costs and access to the Transpac transmission network (Hart, 1988). Three factors account for the success of the central billing policy.

First, the billing system operates on a time-sensitive basis. The more the consumer uses, the more he or she will pay. Second, no other organization than France Télécom is responsible for billing management. Third, because the regular monthly telephone bill displays the fees for videotex usage, there is no need for impractical subscription obligation or identification. The literature underscores the importance of these elements in the Télétel billing scheme (Nahon & Pointeau, 1987; Hall & Terren, 1987; Baer & Greenberger, 1987; Charon, 1987b; Modified Final Judgment, 1988; Mayer, 1988; Malik, 1988).

On the other hand, in the United States, Viewtron charged the subscriber a flat fee of $12 a month regardless of the videotex usage ("Electronic Publishing," 1983; Aumente, 1987). Currently, U.S. information providers tend to base their price strategies on a flat fee. For instance, U.S. Videotel users pay a $15-20 monthly fee that covers the rental of the terminal and basic services usage. Similarly, Prodigy charges customers a flat fee of $9.95 a month during the introduction period.

Legally, a radical shift has also operated. On September 10, 1987, Judge Green allowed the RBOCs to perform some billing management functions, such as consolidated billing (i.e., issuing a single bill for telephone and videotex expenses) (United States v. Western Electric Co., 1987). While the Court agreed on the rationale of a more practical billing system, it did not permit the RBOCs to model on the French sharing-of-revenue system (i.e., financial arrangements between information providers and France Télécom). On March 7, 1988, however, Judge Green issued a second opinion on the billing question and authorized the RBOCs to adopt a billing system similar to that of the Kiosk with the proviso that such a system will remain nondiscriminatory (United States v. Western Electric Co., 1988).

9. Single-standard system

Given the central structure of Télétel, it is no surprise that only a single standard emerged for data transmission and production of terminals. The standardization and compatibility of the system from transmission to reception bolster the expansion of Minitel (Branscomb, 1988; Hart, 1988).

In the United States, the literature seems to treat teletext and videotex interdependently on standardization matters (e.g., Neustadt, 1984; Siegel, 1986). In 1983, the FCC declined to select a single standard for teletext and left this matter to be resolved by the manufacturers (Amendment to the Commission's Rules, 1983). In issuing this decision, the Commission considered that the open market approach constituted the best guarantee of flexibility in an ever-changing technological environment.

In the early 1980s, it appeared that the terms "teletext" and "videotex" were often used interchangeably. Technically, the Commission has issued no order on videotex standardization.

On several occasions, the FCC has affirmed the unregulated status of enhanced services, such as videotex (e.g., Second Computer Inquiry, 1980; Third Computer Inquiry, 1986; see also Vail, 1984). As early as 1982, it was foreseen that the lack of standardization would be detrimental to the development of the videotex industry ("Teletext and Videotext," 1982). Vedel (1988) notes that the FCC refusal to fix a standard is contrary to its underlying role as a "technical cop of the air."

Nonetheless, nothing in the Communication Act of 1934 compels the FCC to regulate videotex terminals. The section 303 (e) of the Act only requires the FCC to set up technical standards "with respect to its external effects" (Communication Act of 1934, p. 492). With its marketplace approach, the Commission refused to adopt network standards for enhanced services, such as videotex, and left this question to the discretion of common carriers and information providers (Third Computer Inquiry, 1986). The fundamental question is whether FCC neutrality on these standardization matters ultimately furthers the public interest and promotes the American technological savoir-faire.

10. Individualized mass medium

This last point summarizes the end result of the Télétel experience. In six years, Minitel created a mass market for videotex use (Branscomb, 1988). The electronic directory service (EDS) initiated the move toward this critical mass by introducing and training consumers to a new mode of social exchanges: "electronic socializing" (Durand, 1983; Maury, 1987; Baer & Greenberger, 1987; Mayer, 1988). But it would be hasty to consider Minitel a mass medium since the penetration rate is still far from the 50% margin (16.6% of telephone subscribers by the end of 1988) ("Télétel: 1988 Facts and Figures," 1989). Nonetheless, De Bens and Knoche (1987) estimate that Minitel will reach a 40% penetration by 1995. In summary, EDS as well as communication services, such as chat services, encourage consumer acceptance of videotex as an individually tailored mass medium.

In addition, France Télécom no longer publishes printed versions of the telephone directory. This policy, at a long term, will force the French to accept terminals or to go to the nearest post office for directory information. Another indicator of the mass market trend is

that videotex users increasingly represent a mass audience, and not only innovators or early adopters. In the mid-1980s, the typical Minitel user was under the age of 40, professional, married with children (Robert, 1986a; Mayer, 1988; Malik, 1988; "Enquête," 1988). These demographic characteristics identify innovators and early adopters of new communication technologies as supported in the diffusion of innovations literature (e.g., Rogers, 1986).

In other words, the average user tended to belong to the middle or upper class and to be younger than the nonuser. In 1987, a survey of Minitel residential users revealed little change in terms of age from 1986 to 1987, but showed a decreasing skew toward white-collar and professional workers ("Enquête," 1988).

In the United States, while information providers propose a multiplicity of services, their target audience remains limited to PC owners (Nahon & Pointeau, 1987; Aumente, 1987; Matos, 1988). Videotex users are more likely to be younger and better educated than nonusers (Ettema, 1984; Rice and Associates, 1984; Dozier & Hellweg, 1984). Moreover, empirical research shows that sex (i.e., more likely to be male) and occupational status are strong predictors in identifying videotex users (Rice and Associates, 1984; Reagan, 1987). CompuServe found that the typical user is male, 38 years old, college-educated with an average annual income of $56,000 (Matos, 1988).

In addition, information providers tend to target their audience in the business, not the residential, areas. It is believed, however, that a trickle-down effect may occur from professional to residential users, stimulating growth of a home-based market (Campbell & Thomas, 1981; Baer & Greenberger, 1987).

II. APPLYING THE FRENCH ELECTRONIC DIRECTORY SERVICE IN THE UNITED STATES

1. Background

In investing in a videotex system, France Télécom was motivated by three concerns: modernization of the telephone network, improvement of phone directory assistance, and technological advance to enter the information age (Mayer ,1988). A fourth overriding reason

for sponsoring EDS was to curtail the increasing costs of paper directory (Maury, 1980). In sum, the rationale for devising Minitel was social, economic, and technological. Table 1 shows the projected number of terminals from 1981 to 1995 and the actual number of Minitels from 1981 to 1988. The forecast of EDS terminals was significantly overestimated. While projections had planned for 22 or 30 million terminals by 1990, France Télécom officials are now predicting that the number of Minitels should approximate 5-6 million by 1990 and 8-10 million by 1995.

In 1981, the French Telecommunications Authority distributed 2,000 terminals to telephone subscribers in Ile-et-Vilaine, Brittany, to evaluate consumers' reactions to EDS. In 1983, EDS became fully operational. Interestingly, at the beginning, subscribers were rather reluctant to use the electronic directory service (Lloyd, 1984; Charon, 1987b). French consumers argued that it was easier and faster to search through the printed telephone book. In 1985, France Télécom inaugurated the national base of EDS enabling access to telephone information on each of the 23 million subscribers.

Although an in-depth technical description of EDS is beyond the scope of this paper, it is important to understand how EDS benefits the consumer, and therefore, how it functions in simple terms. First, in entering the number 11 on their terminal, subscribers are directly connected to a Videotex Point Access (VPA) that displays a search page on the screen. Through the national database, users have access on a 24-hour basis to 25 million listings, including 2 million businesses. Unlike Alex, the Canadian replica of Minitel (see, Alex, 1988), the French EDS contains white pages as well as yellow pages. Users can initiate a search for directory information by name (i.e., person, company), profession, locality or department (i.e., a defined region), or address (i.e., street and street number) (Robert, 1986).

For instance, Minitel allows subscribers to find the telephone number of a company in a specific department (i.e., district) in a few seconds. The major advantage of EDS is the possibility of national search. Prior to EDS, subscribers only had the phone directory of the locality or department at home. For example, before 1985, a person living in Marseille had to go to the post office to verify the telephone number of an acquaintance living in Paris.

NUMBER OF MINITEL TERMINALS IN FRANCE
(millions of units)

YEAR	1981	1982	1983	1984	1985	1986	1987	1988	1990	1995
FORECAST	0.020	0.270	0.800	2.0	4.0	6.6	10.0	14.0	22.0	N/A
									30.0	
									5.0-6.0	8.0-10.0

YEAR	Dec. 1981	Dec. 1982	Dec. 1983	Dec. 1984	Dec. 1985	Dec. 1986	Dec. 1987	Dec. 1988
ACTUAL	0.005	0.011	0.120	0.531	1.305	2.237	3.373	4.228

Notes. From "Plans and Projection for the Electronic Directory Service" by J.P. Maury, 1980, Viewdata and Videotext 1980-81: A Worldwide Report, p. 50, New York: Knowledge Industry; Teletext and Videotex in the United States (p. 16) by J. Tydeman, H. Lipinski, R.P. Adler, M. Nyhan and L. Zwimpfer, 1982, New York: McGraw-Hill; Le Programme Télétel et l'Annuaire Electronique (The Télétel Program and the Electronic Directory Service) (Report from the Ministry of PTT to the Cabinet of Ministers) by the Ministère des Postes, des Télécommunications et de la Télédiffusion, 1985, Paris: Author; "A Videotex Success Story" by J. Grenier and G. Nahon, 1987, July 27, Telephony, p. 47; "Les Médias Electroniques, une Chance pour les Quotidiens Français? (Electronic Media: An Opportunity for the French Newspapers?)" by J.M. Charon, 1987b, In E. de Bens and M. Knoche (Eds.), Electronic Mass Media in Europe. Prospects and Developments, p. 93, Dordrecht, Holland: Reidel; Modified Final Judgment: Hearings Before the Subcomm. on Telecommunications and Finance of the House Comm. on Energy and Commerce, 100th Cong. 1st Sess. p. 118, 1988 (Statement of George Nahon, Managing Director, Intelmatique S.A.); "Vive le Minitel" by E. Booker, 1988a, August 8, Telephony p. 25; "Minitel: 1987 Facts and Figures," 1988, Télétel Newsletter (special issue), 3, p. 3; "Télétel en Chiffres (Figures of Télétel)," 1989, La Lettre de Télétel, 17, p. 24.

TABLE 1

Market researchers have realized the potential benefit of a national EDS for surveying the French population in a geographically representative fashion (Malik, 1988; Van Vracem & Gauthy-Sinéchal, 1988).

In the second step of the process, the entered information is routed via telephone lines to the Inquiry Center (IC) that directs requests for information toward regional or national Documentation Centers (DC). Inquiry Centers basically act as "welcome desks," interpreting and correcting spelling mistakes in the typed entries. Furthermore, the IC identifies synonyms and keywords. For instance, if users entered the word "utility," they would be able to find the telephone number and address of the public utility service. If the subscriber types "masseur," the software will automatically link this word with "physiotherapy," the correct heading for this profession, and will search the phone number accordingly (Robert, 1986b).

As a recent survey demonstrated, EDS remains one of the most popular videotex services. As of January 1988, 90% of residential users and 91% of professional users were either satisfied or very satisfied with EDS ("Enquête," 1988). In 1988, EDS accounted for 18% of the Minitel connect-time and 38% of the calls ("Télétel: 1988 Facts and Figures," 1989). On average, telephone subscribers use EDS eight times a month for about 19 minutes ("The Electronic Directory Service," 1987). By comparison, it is estimated that 21% of the U.S. population consults the phone book on an average day (Neuman, 1985). In addition, EDS is sometimes viewed as an "ice breaker" device (Mayer, 1988, p. 61) to alleviate some of the fears linked to computer use. Therefore, it appears that the electronic directory service has a desirable social effect, as it familiarizes the user with VDT display and basic computer commands.

As to the potential economic impact of EDS on home computer sales, it may be too early to conclude that EDS does or does not boost the development of the home computer market in France. Table 2 shows the evolution of personal computers in France from 1983 to 1987. Except in 1986, we notice a steady trend in home computer sales over this five-year period.

TABLE 2

THE EVOLUTION OF PERSONAL COMPUTERS IN FRANCE
(In thousands)

Year	1983	1984	1985	1986	1987
PC Sales	200	345	450	400	645

Notes. From "L'Evolution du Marché Français (the Evolution of the French Market), 1985, March 14, Le Monde, p. 21; Matériels Electroniques Grand Public (Consumer Electronics Products) (p. 2) by the Syndicat des Industries de Matériels Audiovisuels Electroniques, 1987, Paris: Author; SIMAVELEC (p. 28) by the Syndicat des Industries de Matériels Audiovisuels Electroniques, 1988, Paris: Author.

In the United States, the personal computer market is progressing slowly. The Electronic Industries Association estimates that the penetration rate of personal computers increased only by 1% in 12 months, from 21% in June 1988 to 22% in June 1989 (Electronic Industries Association, 1988; 1989). The introduction of EDS as well as information services on the American market could boost the sales of personal computers, especially if videotex services are mainly available to PC owners, or vice versa.

2. Application of EDS in the United States

In the previous section, the key reasons for the success of Minitel were analyzed in detail. In fact, these various elements form a framework that can outline the possible structure of an EDS system in the United States. As a rule, little nonproprietary research has been published on the possibilities of EDS in the United States. Reports tend to focus on policy issues, such as regulation and intellectual property rights, not so much on the feasibility of the project or consumer acceptance (Adler, Nyhan, & Tydeman, 1981a; 1981b). Unfortunately, these issues were debated prior to the Modified Final Judgment, and therefore, did not take into account the consequences of the AT&T divestiture.

In the early 1980s, a few electronic directory service trials, mostly yellow pages, took place in diverse U.S. cities. These experiments rapidly folded up as they faced strong opposition from the newspaper industry (Plakias, 1986). Currently, the Boston-CitiNet

provides a variety of information services, including videotex directories. CitiNet's strategies hinge on four stalwarts: consumer benefit and utility, interactivity, immediacy, and advertiser education (Kassaraba, 1986).

If the American EDS is modeled on the Télétel system, the RBOCs, acting as central networks for their service areas, will provide low-cost terminals to business and residential users. Because of their financial situation, the RBOCs are almost self-designated for carrying EDS. Also, standardization of transmission paths and terminals will facilitate the use of EDS for telephone inquiry about long-distance calls.

As in France, EDS is expected to trigger consumer interest in videotex services and possibly in personal computers, and will introduce interactive technology in the home. Information services can be offered to users concurrently with EDS as an additional incentive to subscribe to videotex. This above scenario is in fact an adaptation of the Minitel story for the United States. To evaluate the feasibility of this project, an exploratory study was undertaken among 12 major telecommunications companies. The next sections will succinctly describe the methodology and report the results of this preliminary evaluation.

V. METHODOLOGY

a. Statement of purpose

The purpose of this study is to investigate how major telephone companies perceive the application of videotex to phone directory - white and yellow pages. In other words, this research project focuses on the industry's preliminary reactions to the implementation of the electronic directory service based on the French model. Specifically, the study addresses five research questions:

Q1: What is the probability that a telecommunications company will offer an electronic service for white pages in the next five years?

Q2: What is the probability that a telecommunications company will provide low-cost terminals for electronic white pages?

Q3: What is the probability that a telecommunications company will agree with other companies to set a single standard for videotex terminals?

Q4: What are the elements that a telecommunications company perceives as being obstacles to the implementation of an electronic white pages system?

Q5: What is the probability that a telecommunications company will offer electronic white and yellow pages in the next five years (if restrictions were lifted in the case of the RBOCs)?

Due to the exploratory nature of the study, results will be reported quantitatively (i.e., means) and to some extent, qualitatively (i.e., individual comments). Because some respondents commented profusely on the EDS issue, their views need to be stated. For this reason, the qualitative aspect of this research is necessary to assess companies' perceptions toward EDS.

b. Limitations of the study

Yet, there are definite limitations to this type of exploratory study. First, measures of probability, especially in new communication technologies, are being frequently criticized for their lack of relevance, validity, and reliability. Should the restrictions on the RBOCs be relaxed, companies would perhaps change their views or plans about EDS. The study depends heavily on the current regulatory and economic environment.

Upon reviewing the results of a trial, a firm could decide to rectify its strategies, by abandoning the project or by initiating a full-blown regional videotex service. In sum, this study is conditioned by current external factors.

Second, given the size of the sample, the results of the survey do not aim at making generalizations, but at indicating the possible courses of an EDS system. This first assessment will pin down problems that may hinder the deployment of EDS as well as evaluate the feasibility of an EDS system based on the French infrastructure.

3. Data collection

On October 24, 1988, a mail questionnaire was sent to 12 executives in charge of planning and development in telecommunications companies listed in the October 3, 1988, issue of Broadcasting. The sample included the seven RBOCs (Ameritech, Bell Atlantic, BellSouth, Nynex, Southwestern Bell, Pacific Telesis, and U.S. West) and five independent telephone companies (Alltel, Centel, Contel, GTE, and United Telecommunications). Ten days later, on

November 3, 1988, a follow-up letter accompanied by a extra questionnaire was also forwarded to each of these 12 executives. All respondents were granted anonymity as an additional incentive to complete and return the questionnaire. Out of 12 possible respondents, 10 completed the questionnaire, and one sent comments on the issue. Five questions were carefully drafted to reflect the characteristics of the French model and prevent refusals on the basis of confidentiality. All questions but one used ratio scale measurements from zero to ten, zero meaning extremely unlikely and ten meaning extremely likely.

V. RESULTS

Table 3 quantitatively summarizes the results of the survey for each research question.

1. Probability of electronic white pages in the next five years

As to the future of electronic white pages, the RBOCs' perceptions (M = 8.00) differ from those of the Independents (M = 3.50). In general, the RBOCs predict that it is very likely that they would offer electronic white pages in the next five years. Five companies rated this eventuality on a nine or 10 level. The fifth BOC circled a zero, indicating that there is no chance whatsoever that the company will offer computerized electronic white pages by 1993. On the other hand, the four independent companies rated this possibility as very unlikely (M = 3.50).

2. Probability of offering low-cost terminals for electronic white pages

The results in Table 3 reveal a quasi-consensus on this issue among telecommunications companies (M = 4.00): the RBOCs and the Independents perceive that it is unlikely or very unlikely that they will supply low-cost terminals for electronic white pages in the near future. While the RBOCs are currently barred from manufacturing terminals, but not selling them, the Independents are not restricted from doing so.

3. Probability of a single standard for videotex terminals

While one RBOC rates this possibility as extremely likely (10), the other companies appear to have mixed feelings about the question of standardization. The RBOCs' mean for this

TABLE 3

SUMMARY OF THE RESULTS

(n = 10)

1. Probability of offering electronic white pages in the next five years

Respondents	Mean
RBOCs	8.00
Independents	3.50
All Companies	6.20

2. Probability of offering low-cost terminals for electronic white pages

RBOCs	4.20
Independents	3.75
All Companies	4.00

3. Probability of single standard videotex terminal

RBOCs	5.40
Independents	2.50
All Companies	4.11

4. Obstacles to the implementation of electronic white pages for the RBOCs
(n = 6)

Items	Number of responses*	%
1. initial investment costs	2	11.1
2. lack of revenue	3	16.7
3. little consumer interest	3	16.7
4. little company interest	1	5.5
5. fear of government intervention or regulation	3	16.7
6. lack of standard for videotex terminals	3	16.7
7. problem of implementing a network for videotex terminals	3	16.7
TOTAL	18	100.0

*Multiple answers are permitted.

5. Obstacles to the implementation of electronic white pages for the Independents
(n = 4)

Items	Number of responses*	%
1. initial investment costs	2	15.4
2. lack of revenue	2	15.4
3. little consumer interest	3	23.1
4. little company interest	2	15.4
5. fear of government intervention or regulation	0	0
6. lack of standard for videotex terminals	2	15.4
7. problem of implementing a network for videotex terminals	2	15.4
TOTAL	13	100.0

*Multiple answers are permitted.

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6. Obstacles to the implementation of electronic white pages for All Companies
(n=10)

Items	Number of responses*	%
1. initial investment costs	4	12.9
2. lack of revenue	5	16.1
3. little consumer interest	6	19.3
4. little company interest	3	9.7
5. fear of government intervention or regulation	3	9.7
6. lack of standard for videotex terminals	5	16.1
7. problem of implementing a network for videotex terminals	5	16.1
TOTAL	31	100.0

*Multiple answers are permitted.

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7. Probability of offering electronic white and yellow pages in the next five years

Respondents	Mean
RBOC	8.67
Independents	5.12
All Companies	7.25

question is 5.40, indicating a positive, albeit not strong, probability that the telecommunications companies might get together to set a standard for videotex terminals. Among the Independents, two companies estimate that an industry consensus will never happen (0 level). As a whole,the independent companies reported that such a standardization scheme is very unlikely to occur in the future (M = 2.50).

4. Obstacles to the implementation of electronic white pages

Table 3 exhibits the main objections of the RBOCs and Independents to the implementation of EDS. Although the size of the sample somewhat affects the reliability of these results, we can observe some recurrent concerns. While the RBOCs anticipate a lack of revenue combined with high start-up costs, they are equally concerned about the lack of standardization and the technical set-up of the videotex network. Only one RBOC, however, mentioned little company interest as an obstacle. In sum, the Bell Companies' objections relate as much to technical feasibility as to economic viability.

For example, one RBOC suggested that additional research is needed to determine whether the costs of EDS will be lower than those of the current printed directory system. The respondent also mentioned that "interconnection between telephone companies for access to telephone information databases would be a major consideration." He pointed out that, unlike France, the United States has a multiplicity of databases.

In addition, three respondents were concerned about the possible lack of revenue in the electronic white pages business. In support of their assumption, some RBOCs argue that the real market is with electronic yellow pages, not white pages. Also, three RBOCs expressed some concerns about possible government regulation of computerized white pages.

As to the Independents, they tend to point to a variety of possible impediments to the installation of EDS. Except for the absence of fear of government regulation, the independent companies do not single out specific obstacles. For a majority of Independents, concerns are economic as well technical. Interestingly, the item little consumer interest is considered by the Independents as the most prevailing obstruction to the establishment of an electronic white pages system. Additional research may be needed to determine whether their assessment

derives from market research surveys or from prejudiced judgments based on the failure of previous videotex projects.

5. Probability of electronic white and yellow pages in the next five years

The most significant result is that the RBOCs do not rate the probability of electronic white and yellow pages much higher than the probability of electronic white pages alone. Indeed, the Bell Companies perceive the offering of electronic white and yellow pages in the next five years as very likely (M = 8.67). On the other hand, the Independents tend to rate higher the probability of electronic white and yellow pages (M = 5.12) than that of electronic white pages alone (M = 3.50).

VI. CONCLUSIONS AND RECOMMENDATIONS

After the examination of the literature and the survey of telecommunications companies, this last section of the paper will center on interpreting the results and recommending some guidelines for the development of EDS in the United States. The survey of literature serves as an analytical preamble to the empirical study by comparing French and American videotex operations. The results of this preliminary study suggest four directions:

1. It appears that if any electronic white pages will ever be offered by 1993, the RBOCs will assume the role of distributor. Given their lower financial status, market penetration, and possibly lack of interest, it is no surprise that the Independents are less likely to venture into the electronic white pages business in the next five years.

2. Unlike the French Telecommunications Authority, American telephone companies are not very inclined to provide low-cost terminals for EDS and to set a single standard system for videotex terminals.

3. Most telecommunications companies perceive that the obstacles to the implementation of electronic white pages are economic (i.e., revenue, investment) as well technical (i.e., standardization, network design).

4. The RBOCs indicated that the probability of offering electronic white pages alone and the probability of offering electronic white and yellow pages is very similar. In light of this result, it may be deduced that the RBOCs may plan to provide electronic white pages, regardless of the regulatory status on electronic yellow pages. Another plausible explanation is that the Bell Companies may predict that if they will ever provide an electronic directory service, they will include white and yellow pages. In other words, maybe, they link the existence of electronic white pages to that of yellow pages. Also, it appears that electronic yellow pages could provide the independent companies a strong incentive to offer an electronic directory service to the public.

Finally, in view of the literature and the results of the survey, some actions are recommended to facilitate the introduction of EDS in this country.

1. This paper did not debate the pros and cons of the current restrictions imposed on the Bell Companies. Nevertheless, authorizing the RBOCs to generate electronic yellow pages is desirable to stimulate the development of EDS and the growth of the consumer videotex industry, and to promote information technology as a mass communication medium. Reasons for supporting the installation of EDS systems have been developed in the introduction and throughout the text. If we consider the relatively few developments undertaken by independent companies in this area, we may be tempted to conclude that the competitive advantage of the Bell Companies will best serve the public interest, rather than diminish small companies' opportunities. While more than 20 electronic yellow pages companies have emerged in the last years, they have mainly focused their attention on the talking yellow pages business (i.e., audiotext).

Repeatedly, the RBOCs have indicated that they would consider offering electronic yellow pages if the Court's restrictions were relaxed (e.g., Roberts, 1987). Indeed, this economic incentive could produce direct social benefits for the videotex users as well as for the society. In 1987, the revenues of the yellow pages publishing business was estimated to $7.3 billion, of which two thirds were collected by the Bell Companies (Carnevale, 1988).

2. The electronic directory service - white and yellow pages - can play a pivotal role in triggering the development of a home-based market. Moreover, as the French experience tends to demonstrate, EDS is likely to generate social benefits for the consumer and the society, such as a higher level of computer literacy (Markham, 1988). In this context, additional research is needed to assess consumers' reactions and predispositions toward the electronic directory service.

3. It is essential to research what consumers need and expect from EDS and videotex services and to what extent they will use the same type of service over time. The tracking of Minitel usage can provide information providers and telephone companies insights and indicators about consumer attitude and behavior. For example, one RBOC mentioned that electronic white pages may not be sufficiently attractive to motivate a mass audience to use videotex services. Another respondent stressed that marketing of information should be consumer-driven (e.g., easy-to-use terminals).

4. The RBOCs have expressed real concerns about consumer interest in information services (e.g., Wilson, 1988b). Télétel officials readily admit that there was no demand for consumer videotex (Peterson, 1986; Booker, 1988a). For this reason, it is up to the telecommunications companies to promote the advantages of videotex and create consumer awareness and need.

In conclusion, the U.S. telecommunications companies do not necessarily perceive that Minitel, despite its advantages, is the most adequate videotex system for this country. This study indicates that videotex services should be adapted to the social, economic, and legal structures of the American society. Yet, there is reason for optimism. Even though French and American views differ on what constitutes an optimal videotex system, practitioners and academic researchers should take full advantage of the French experience to explore the possibilities of a home-based videotex market in the United States. In a time of international cooperation, this reasoning has never been as true as it is today.

NOTES

1.Officially, Minitel refers to the name of the terminal while Télétel designates the videotex system. By extension, Minitel usually describes the entire system. In this paper, Minitel and Télétel will be used interchangeably unless specified otherwise.

2.In 1987, Arlen Communications reported that the number of videotex users reached the 1.2 million mark (Booker, 1988b). In 1988, Interactivity Report estimated that the U.S. videotex industry counted 1.3 million users (Arlen, 1988).

3.In the literature and trade press, "electronic messaging service" is often called "message service," "messagerie," or "chat service."

4.While several academics consider 1989 as the end of the Modified Final Judgment, others believe that AT&T will not be permitted to enter the information business before 1991. The issue at stake is to determine what is the exact date of the MFJ entry. AT&T petitioned the Court to make sure that the MFJ will end on the expected date, August 24, 1989 ("NCTA Won't Oppose AT&T Entry," 1989).

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